Soil Conservation

March 1980

U.S. Department of Agriculture

An Action Magazine 2

RAMP Firsts 4

Conservation by the Year 17

From the Administrator

A New Era in Conservation Communications

Next month as we observe the 45th anniversary of the Soil Conservation Service, we also will begin a new venture in conservation communications.

Soil Conservation, authorized and first published in August 1935 as the official organ of SCS, will become *Soil and Water Conservation News*.

The new format as a newsmagazine represents an attempt to be more responsive to the needs of our primary audience—district governing boards and SCS personnel at all levels—for more news of significant developments affecting conservation of soil, water, and related resources.

A USDA task force created last year to review agency publications was empowered by Secretary Bergland to recommend changes in any of the Department's 26 periodicals. The task force recommended that SCS make its periodical more responsive to its intended audience.

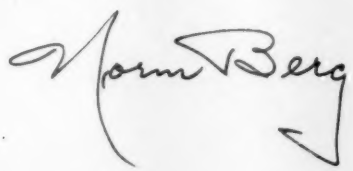
What will *Soil and Water Conservation News* do differently or better than *Soil Conservation*?

The newsmagazine, first of all, will allow SCS to increase the number of articles even though the periodical will decrease in size, from 24 to 16 pages, and to save in printing and related costs. At the same time, we will be able to increase the timeliness of our reporting in an era of fast-breaking developments in the whole field of natural resource conservation.

There is an urgent need, for example, for timely reporting of progress under the Soil and Water Resources Conservation Act. As for the diverse water quality problems associated with nonpoint source pollution, there is a need for greater sharing of research results, techniques, and methods that work well in controlling or solving these problems. In the heretofore largely untouched area of conservation management, there also is much to report and share with our audience.

Soil Conservation has served conservationists and the public well in reporting the changes in conservation for the better part of the last half century. It will remain an invaluable record of the conservation movement as it has evolved in our Nation and abroad. It also is eloquent testimony to the many accomplishments of SCS and its primary partners, the conservation districts.

As we bid a fond farewell to a periodical that met our needs in more leisurely times, we heartily welcome the soon-to-be-born *Soil and Water Conservation News*. It will record and reflect so many of our efforts and hopes in the "Action Eighties" and beyond.



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Soil Conservation

Contents

From the Administrator 2

First RAMP Contract Awarded 4
Ted Kupelian

First Two RAMP Projects Completed 5
Corey Bernat

A Prairie for New Hampshire 6
Frederick B. Gaffney and David N. Allan

Santa Teresa—A Model of Conservation Foresight 7
Marjorie Johnson and John Allen

Partnership for Plants 8
Brenda Johnson

Conservation Plants on Display 10
Michael McCrary

'Cardan'—A Break for Windbreaks 11

'Covar' Means More Cover 12
Jack Carlson and Clarence Kelley

A Bonanza for Wildlife 13
Jimmy Henry

Contour Orchards Pay 14
Frederick E. Bubb

New Publications 16

Conservation Highlights 1979 17

Index to Volume 45 21

Meetings Back cover

Cover:
This minimum-tilled cornfield in Baltimore County, Md., is typical of the 55 million acres of cropland on which farmers used various forms of conservation tillage in fiscal year 1979. Fifteen years ago, farmers used conservation tillage on only 4 million acres. (See "Conservation Highlights 1979" beginning on page 17.)

RAMP Progress

First RAMP Contract Awarded

by Ted Kupelian

Nearly 2,500 landowners have signed up to participate in a nationwide program to reclaim abandoned non-Federal coal-mined land. The Rural Abandoned Mine Program (RAMP) is one of four programs authorized by Title IV of the Surface Mining Control and Reclamation Act of 1977. Under RAMP, the Soil Conservation Service provides cost-share funds and technical assistance to land users and administers the program in cooperation with the U.S. Department of the Interior, State and local governments, private landowners, and soil and water conservation districts.

Because funds are limited, RAMP will concentrate on the more severe problems first. First priority is the protection of public health, welfare, safety, and property from extreme danger caused by past coal mining. Second priority is the protection of public health, safety, and general welfare from adverse effects of mining, and third is the restoration of the environment where it has been degraded.

The following 21 States have received applications for reclaiming rural abandoned coal-mined lands under the program: Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Montana, North Dakota, Ohio, Oklahoma, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, West Virginia, and Wyoming.

West Virginia, with 84,868 acres eligible for reclamation under RAMP, is where the first contract was awarded.

The residents of Junior, W. Va., are proud to be the first to be awarded a contract under the Rural Abandoned Mine Program (RAMP)—and relieved. Through the program, the town of 500 will be able to reclaim a dangerous abandoned coal mining site where local children played despite warnings from their parents.

Sheldon Findley, Soil Conservation Service resource conservationist, said, "Children would play outside the mines and when they got hot, they would crawl back into the mines to cool off. The children would also play in the charcoal ovens, and they had even set up benches in one of the ovens. At the site, children have stepped on nails and run them into their feet, but luckily so far no one has been lost in the deep mines."

Besides presenting a real danger to children in the area, the abandoned mine site was contributing to pollution of the Tygart River. Eroded material from a spoil pile and acid water from all four mine openings eventually entered the river.

The 12-acre tract of abandoned coal mined land in Junior presented a hazard to public health, safety, and welfare. Reclamation work under the 5-year, $113,000 RAMP contract will include sealing four open mine shafts, regrading a highwall, removing a refuse pile, and leveling a decaying minewaste processing structure. A large pile of mine refuse will be smoothed and covered with soil.

A Junior resident and principal landowner of the mined site, Charles Hillyard, leased 8 acres of the mined land to the town for the reclamation project. "I had read about RAMP and was very interested in it. So, when SCS personnel approached me about the town's reclamation plans, I was glad to participate," Hillyard said.

The primary objective of the reclamation work in Junior is to eliminate public hazards. Secondary objectives include improving the environment and using the land for wildlife habitat, pasture and hayland, and recreation.

Mayor of Junior, Leon Stevenson, said, "The children here have never

SCS District Conservationist Michael Marks examines one of four mine openings which will be sealed to prevent access to the mine interior, thereby eliminating a safety hazard to children playing in the area.

really had a safe place to play. This is a small town and we just do not have the recreational facilities of larger towns."

Stevenson said that after reclamation the town hopes to build a baseball diamond, a combination basketball and volleyball court, and a tennis court on part of the land.

The residents of Junior are grateful and proud to have been awarded the first RAMP contract. As a result of the program, and the willingness of the involved landowners, the southern town limits will soon wear a new face, highlighted by recreation facilities for the entire community to enjoy.

Mr. Kupelian is a writer-editor, Information Division, SCS, Washington, D.C.

First Two RAMP Projects Completed

by Corey Bernat

Although a West Virginia town was awarded the first RAMP contract, Pennsylvania can claim the first two completed projects. Much smaller than the West Virginia project, the two in Pennsylvania involved only about 1 acre each.

The first completed Pennsylvania project, located on church grounds in Bedford County, presented a danger to neighborhood children who played there.

Under the RAMP project, two air shafts were closed by excavating the area and filling the shafts with crushed stone. Two mine entrances were filled in with mine refuse and pieces of concrete from old structures on the site. A large concrete block, which had been a tipple base, was buried. Soil from the excavation was used to provide a base for seeding fescue.

The second of the Pennsylvania projects was located in Greene County only 1,000 feet from a high school. Landowners Brian and Bruce Blair, knowing that an open mine shaft on their land presented a danger to youths playing in the area, asked Soil Conservation Service District Conservationist Karl Niederwerfer to help in closing the shaft.

Niederwerfer took the problem to the local RAMP committee and the Blairs' application for assistance was chosen as a high priority project. Work was undertaken to excavate around and fill in the shaft. Then the area was leveled and seeded to fescues.

After the work was completed, Theodore Carlson, principal of the nearby high school, said, "Now I can breathe a sigh of relief. To have an open shaft like that near a populated area is dangerous."

Completion of the projects in Bedford and Greene Counties leaves Pennsylvania with about 240,000 acres of unreclaimed or inadequately reclaimed abandoned mine land. Pennsylvania has the highest acreage of rural abandoned coal-mined land eligible for reclamation under RAMP.

Mr. Bernat is public information specialist, SCS, Harrisburg, Pa.

A section of the abandoned mine site in Junior, W. Va., will be graded, covered with soil, seeded to grass, and used for community recreation.

A Prairie for New Hampshire

by Frederick B. Gaffney
and David N. Allan

The last glacier retreated from New Hampshire about 10,000 years ago, leaving behind a rich mantle of gravel and sand which has been mined at a rapid rate. Today in many areas, barren gravel pits are all that remain after the mining. The scarred land is recovering gradually as plants seed in from nearby areas, but natural plant succession takes years. Meanwhile, communities adjacent to the mined areas must look out over the open, scarred land.

A typical example of this situation is the gravel pit owned by the Public Service Company of New Hampshire in Londonderry. The company had mined a large esker, or gravel ridge, under a powerline right-of-way, exposing a strip of sand and gravel. Initiating a town beautification project, the Londonderry Conservation Commission decided to plant shrubs to screen the pit. At the same time, the Soil Conservation Service was searching the Northeast for sites on which to make field evaluation plantings of native grasses. SCS was trying to determine the effectiveness of using warm season grasses for re-vegetating gravel pits.

When Jim Hayden, SCS district conservationist in Rockingham County, learned of the Londonderry site, he contacted the Public Service Company to see if SCS could use the gravel pit as a field evaluation planting site under the conservation commission's project.

The Public Service Company was pleased to cooperate. Hayden and Socrates Macrigeanis, the Public Service forester, worked out the details of land use and made up a work plan. The company leveled the site with a bulldozer and erected a fence to discourage motorbikes from crossing the area.

John Connor, a Rockingham County Conservation District supervisor, and his brother-in-law, Daniel Hicks, provided equipment and took time from their busy apple orchard business to help install the vegetation plots over a 3-year period. They supplied tractors, lime spreaders, and a disk harrow.

First they disked the area to make a uniform seedbed—a difficult task in cobbly gravel. Then they spread the lime and harrowed it in. The plots were staked in a grid pattern and hand seeded to various grasses. They then hand mulched the plots with old hay, using a straight disk harrow to cut it into the gravel. This was an important step in anchoring the mulch. A previous seeding of crownvetch and birdsfoot trefoil, established by a contractor for the Public Service Company, lost its mulch to strong winds a few hours after seeding as long windrows of hay rolled across the gravel pit.

Plants seeded into such low fertility sites need to establish and persist in order to provide water and dust erosion control with a minimum of maintenance. This requires the use of plants typical of the Prairie States, such as switchgrass and big and little bluestem. These plants have good potential for reclaiming sand and gravel pits. They are slow to establish, however, requiring the use of good clean mulch held in place. If the mulch is blown off, a seeding failure can be expected.

Plantings should not be fertilized at the time of seeding, because fast growing weeds within the mulch would soon smother the slow growing grasses. Fertilizing 1 year after seeding, when the grasses are actively growing, will give the plants a good boost to compete with any weeds. No further maintenance is required.

The trial plots included plantings of legumes such as birdsfoot trefoil, crownvetch, and 'Lathco' flatpea. These can be successfully used if the ground is seeded properly and if the seed is inoculated with appropriate bacteria that fix nitrogen in association with root growth. However, if unconsolidated deep sands are present, warm season grasses may be a better choice, especially little bluestem. The "perfect" seeding mixture and least costly method of establishment which will insure protection to such areas are still being sought by SCS.

In Londonderry, what was once a blight on the land has been changed to a waving, shoulder-high stand of big bluestem and switchgrass. With a little imagination, one can picture that great sea of grass that once welcomed settlers as they pushed west across the prairie.

Mr. Gaffney is plant materials specialist, SCS, Syracuse, N.Y.
Mr. Allan was biologist, SCS, Durham, N.H., and is now retired.

Santa Teresa—A Model of Conservation Foresight

by Marjorie Johnson
and John Allen

"Conservation is crucial but often ignored by developers," said C. L. "Charley" Crowder, developer of the Santa Teresa subdivision in Dona Ana County, N. Mex. But Crowder hasn't ignored conservation in his work.

Crowder, a cooperator with the La Union Soil and Water Conservation District, used soil survey, hydrology, and drainage information provided by the Soil Conservation Service and State and private agencies when he developed the 7,200-acre Santa Teresa subdivision 11 miles northwest of El Paso, Tex.

"The first thing we did before acquiring the property was a drainage study," said Crowder. "We wanted to be sure we could control the drainage. Average annual rainfall is only 8 to 10 inches, but it often comes in two or three downpours. The soil is porous; but when it's covered with concrete, everything changes.

"We used drainage information provided by SCS to determine where the water would go and to locate streets where the drainage would best be handled," explained Crowder. "One of the most important things we do is what we don't do. For example, scraping the land and removing vegetation doesn't make sense to us. We tried to develop plans that would make the subdivision fit the land and not the other way around."

Crowder contracted with a private consulting group to make a detailed soil survey. The survey data were based on criteria used by SCS in compiling soil information. The survey shows five different soil types within the boundaries of the subdivision.

"The soils range all the way from sugar-sand to hard clay," said Ron King, project engineer. "We kept the clay areas with high shrink-swell properties in open space. That soil is all right for recreation, but special construction methods are required if a structure is built on it."

Some of the clay is used to "plate" the bare building sites to control wind and water erosion. King said this works very well even though builders aren't enthusiastic about the practice. "We ask them to till the clay into the soil to increase the water-holding capacity," King said, "but most of them scrape it off when they get ready to build."

Clay was also used to seal the bottom of the six lakes on the two 18-hole golf courses.

"All the lakes have been stocked with bass and catfish, and one of the lakes stores irrigation water for the greens," said King. "The lakes have water-level recorders in them. In our agreement with the New Mexico State Engineer's Office, we are required to 'pay back' water to the Rio Grande River. When the water in the lakes reaches a certain level, it is automatically released to flow to the river."

Drinking water for more than 175 homes already built comes from some of the 32 wells in the subdivision. "In the planning stages, we concerned ourselves with the basics," Crowder said. "In this part of the country, that means water. We drilled for it and developed a supply that can satisfy the needs of 60,000 people. Each well will yield about 800 gallons a minute."

In New Mexico, any development that affects soil and water resources must meet certain requirements of the soil and water conservation district. The district's review responsibility lies primarily with that part of the subdivision plan that deals with terrain management. The district gives its opinions to the county commissioners on two separate issues: conformance with county and State regulations and whether or not the developer can fulfill the proposals contained in his or her disclosure statement.

Included in the district's review are:

- Terrain management plan;
- Drainage plan, hydrology computations, and water control structures;
- Existing contours and lot locations;
- Soil information;
- Flood plain management; and
- Road and street locations and slopes.

"Federal, State, and local governments have strict regulations to meet," Crowder said, "but every one is necessary. What we do now will affect many people. We couldn't afford to cut corners even if we could get by with it.

"We have depended heavily on SCS," he said. "We used soil survey, drainage, and other information from the first step to where we are now."

Ms. Johnson was public information officer, SCS, Albuquerque, N. Mex.
Mr. Allen is district conservationist, SCS, Las Cruces, N. Mex.

Partnership for Plants

With its nursery beds reaching toward Bismarck in the background, the Lincoln-Oakes Nursery shares land with the Bismarck Plant Materials Center. At the two facilities, SCS and the North Dakota Association of Soil Conservation Districts work together to improve conservation plant materials.

In the northland, helping and sharing are a way of life. The cold, harsh winters and sometimes dry, windy summers demand a mutual dependence between people and natural resources, for survival's sake. However, proper conservation of these resources demands awareness and attention from everyone concerned with the future. When individuals plant trees and grass, they are practicing beneficial and visible forms of soil conservation.

Not only do individuals work together to satisfy the needs of the land, but many agencies, organizations, associations, and other groups also share the techniques and resources available to accomplish common goals.

A prime example of such a close working relationship and common concern is the Lincoln-Oakes Nursery at Bismarck, N. Dak., operated by the North Dakota Association of Soil Conservation Districts (NDASCD), and the Bismarck Plant Materials Center (PMC), operated by NDASCD and the Soil Conservation Service. SCS and NDASCD have worked together for more than 30 years to improve grasses, shrubs, and trees for use in conservation programs in North Dakota. Many of the improved plant materials developed through this cooperative work have also made substantial contributions to the conservation programs in Minnesota, Montana, and South Dakota.

"The two agencies are a good combination," SCS PMC Manager Russ Haas said. "SCS provides the selection and development of improved trees, shrubs, and grasses and the association's nursery provides production and distribution of these released materials to soil and water conservation districts.

"Presently," he continued, "we have

by Brenda Johnson

a greenhouse for budding and grafting plants, and a modern, fully equipped seed-cleaning plant. We also have a building leased from the association that has room for an office, grass seed and machinery storage, and a recently installed cold storage unit for woody plants.

"Our close relationship with the association and the Lincoln-Oakes Nursery has proved to be a very viable one," Haas explained. "It provides a unique opportunity for final field testing of plants under a wide range of soil, climatic, and management conditions."

From 1937 to 1953, SCS operated a nursery for the production of grasses, trees, and shrubs. The site originally was located at the USDA Science and Education Administration-Agricultural Research station near Mandan, N. Dak. Some time before 1953, the operation was moved to an area of bottom land between the Heart and Missouri Rivers and Bismarck and Mandan. Due to the potential flood hazard, a new site was obtained south of Bismarck, across from old Fort Lincoln. During the winter of 1953, the buildings from the old site were moved to the new Fort Lincoln site and, appropriately, called the Fort Lincoln Nursery.

In late 1953, the U.S. Department of Agriculture discontinued all SCS nurseries, and the operations of the Fort Lincoln Nursery were turned over to the NDASCD and became what is now the Lincoln-Oakes Nursery. NDASCD nursery operations had previously been carried out on a 50-acre nursery in Oakes, N. Dak. The agreement called for granting all equipment, material, and growing stock to the association. The buildings and land were provided on a long-term lease.

In 1956, title to the land and buildings was transferred to the State of North Dakota by the Federal Government. The control, custody, possession, supervision, management, and operation of the lands were vested in the NDASCD for use in carrying out the soil conservation program of the soil conservation districts of the State.

The SCS PMC operations are conducted through an agreement between the NDASCD and SCS on about 60 acres of Lincoln-Oakes Nursery land in Bismarck. The Lincoln-Oakes Nursery also furnishes a full-time district employee, field labor during the busy season, some equipment, irrigation water, and miscellaneous materials. SCS reimburses the NDASCD for the above each month according to an annual financial supplement to the agreement between the two parties.

The association still operates the Oakes Nursery for the production of grasses. Later purchases of additional land have increased its size to the present 180 acres.

The PMC employs a manager, a full-time conservationist, and part-time stenographer. Also, associated with the PMC is a plant materials specialist who serves Minnesota, South Dakota, and North Dakota, the same States served by the PMC.

Acceleration of the plant materials program on mine spoil reclamation, as well as expanded field trials throughout the three States, was made possible by the allocation of additional funds from USDA's Forest Service Surface Environment and Mining (SEAM) program and the U.S. Environmental Protection Agency. Because of these additional funds, the PMC was also enabled to upgrade its equipment.

Lee Hinds, Lincoln-Oakes Nursery manager, said, "The association has long been a staunch advocate of improved plant materials and feels that the cooperation of the association and SCS through the mutual effort at the Bismarck Plant Materials Center is a necessary and productive relationship to meet the goals of good conservation on the land."

Ms. Johnson is information assistant, SCS, Bismarck, N. Dak.

Conservation Plants on Display

by Michael McCrary

The Crider Memorial Garden of Conservation Plants in Beltsville, Md., displays more than 80 varieties of conservation plants. These plants represent the many grasses, legumes, forbs, shrubs, and trees selected by Soil Conservation Service plant materials centers for use in conservation and environmental improvement programs. They are all currently in commercial production and extensively used throughout the country. The 2-acre garden is part of the SCS National Plant Materials Center (PMC) in Beltsville.

The garden was dedicated in 1967 to Franklin J. Crider, an SCS plant materials specialist who, in the 1930's, devised the procedure that is still used today for testing and evaluating soil-conserving plants. Using the procedure, SCS PMC's and cooperating agencies have developed more than 200 improved varieties of plants which are extensively used throughout the country to help solve high priority soil and water conservation problems.

The garden is open to visitors year round. A pamphlet prepared by the National PMC contains a chart of the plantings and describes each plant and tree on display in detail. The pamphlet tells where each plant is best adapted, how it is used, and whether or not it is native to the area of use or an introduced species.

The conservation plants at the garden are grouped into warm season grasses, warm season legumes and forbs, cool season grasses, and cool season legumes and forbs. Releases of improved woody plants are displayed around the perimeter of the garden which was designed to be expanded to include new releases as they become available. As a plant is released to commercial growers, the PMC releasing it sends seed or starter plants to the Crider garden.

To prevent erosion and provide easy access to visitors, the entire garden was planted to Kentucky 31 fescue to provide year-round grass cover. Ten-foot-long rows of the sod are removed for the conservation plantings as needed.

In 1978, 17 new varieties of conservation plants were released by SCS in cooperation with other agencies. These and other improved plant materials developed cooperatively by SCS and provided to commercial producers amounted to an estimated 13 million pounds of seed, 9 million woody plant seedlings, and 40 million plants, clones, or sprigs. This equals the amount of seed and plants it takes to treat 1.7 million acres of land.

Effective use of conservation plant materials reduces erosion and sedimen-

More than 80 varieties of conservation plants, currently produced commercially and used extensively, are permanently displayed in the Crider Memorial Garden of Conservation Plants in Beltsville, Md. The plants were developed by SCS and cooperating agencies.

tation, increases production, and improves the environment. Conservation plants are being used throughout the country to stabilize sand dunes, to protect streambanks and shorelines, to plant windbreaks and shelterbelts, to reclaim mined land, to protect and improve pasture and rangeland, and to provide wildlife food and cover.

At Crider garden, visitors can see conservation plants from the Northeast—'Cardinal' autumn olive; from the South—'Pensacola' bahiagrass; from the Midwest—'Blackwell' switchgrass and 'Kaw' big bluestem; from the West—'Rosana' western wheatgrass and 'Wytana' fourwing saltbush; and from the Southwest—'Corto' Australian saltbush. These and many other hard-working plants on display at Crider garden represent the results of more than 40 years of plant materials work.

Mr. McCrary is manager, National Plant Materials Center, SCS, Beltsville, Md.

'Cardan'—A Break for Windbreaks

The U.S. Department of Agriculture's Soil Conservation Service (SCS) and Science and Education Administration (SEA) announce the naming and release of 'Cardan' green ash.

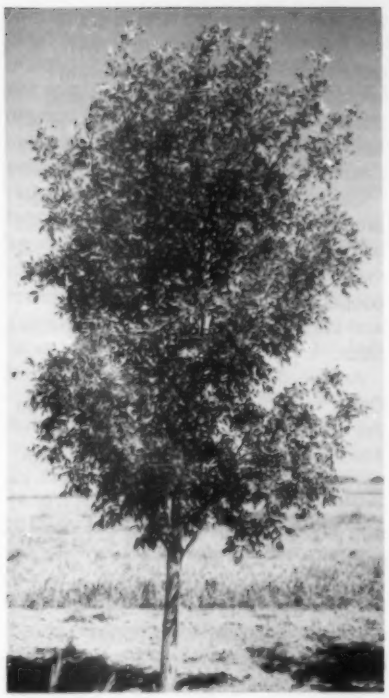
Green ash is a deciduous hardwood tree which occurs naturally in the northern Great Plains and grows along streams and woody draws. The Cardan selection is recommended for use in farmstead and field windbreaks, wildlife habitat, and natural area plantings to restore surface-mined lands.

This selection had been tested as Mandan-12002 at the SEA-AR Northern Great Plains Research Center, Mandan, N. Dak. The variety was propagated in 1954 from seed collected by the late Dr. Ernie George, of the research center, from a farmstead windbreak in Wibaux County, Mont.

Cardan has been planted extensively by SCS in farmstead and field windbreaks in North Dakota, South Dakota, and western Minnesota, with limited plantings in adjacent States and SCS plant materials centers.

Results of the SCS plantings show that Cardan green ash is well suited to the northern Great Plains. It performs well with excellent survival and growth rates on a wide range of soils and climatic conditions typical of the Plains. The tree is medium size and may grow to 50 feet.

The Northern Great Plains Research Center will maintain breeder seed and foundation stock. The selected class of certified seed is available through the USDA SCS Plant Materials Center, P.O. Box 1458, Bismarck, N. Dak. 58501.



'Covar' Means More Cover

by Jack Carlson
and Clarence Kelley

Conservation-minded land users of the Pacific Northwest have a new groundcover available for reducing erosion, controlling weeds, and landscaping in low-rainfall zones. It is multiple-purpose 'Covar' sheep fescue, *Fescue ovina var. ovina L.*

Covar, released for commercial seed production in late 1977, was developed by the Soil Conservation Service Pullman Plant Materials Center (PMC) in cooperation with the Idaho, Oregon, and Washington Agricultural Experiment Stations.

An excellent erosion control plant, Covar is a tremendous root producer in the arid regions where it is adapted. Tests in eastern Oregon and Washington show Covar to be excellent for roadside seedings. A fine-leaf fescue with a slight bluish cast, it is very pleasing to the eye. These attributes, combined with its durability, also make Covar a desirable dryland turf for homes, campsites, playgrounds, airports, and other landscaped areas.

This newly introduced variety is recommended also for increasing species diversity, controlling erosion, and reducing weeds in range improvement efforts. Adapted throughout the range of Idaho fescue, Covar has proved an adequate substitute for this unavailable, low-seed-producing native fescue.

Although slow starting, Covar will crowd out rangeland weeds such as cheatgrass and medusahead rye. It may also dominate companion bunchgrasses and should be seeded only when erosion and weed control are primary concerns. It does not produce as much as the wheatgrasses or other commonly used dryland forages.

Covar is similar to the widely used 'Durar' hard fescue (also released by the Pullman PMC), only much more drought tolerant. It is adapted down to 10 inches precipitation on medium-textured soils. Normally planted in early spring, Covar may take 3 years to develop a complete stand. It should be seeded with a rapid-developing bunchgrass such as crested wheatgrass.

Seeding Covar alone requires adequate mulching and is not recommended for steep slopes without careful management.

The tough chewings, creeping red, and hard fescues have been widely used for conservation groundcover in the Northwest for many years. Now another—Covar sheep fescue—is available for low-rainfall areas.

Mr. Carlson is plant materials specialist, SCS, Spokane, Wash.
Mr. Kelley is manager, Pullman Plant Materials Center, SCS, Pullman, Wash.

'Covar' sheep fescue is a durable erosion control plant. It is drought tolerant and has been used successfully in roadside seedings in eastern Oregon and Washington.

A Bonanza for Wildlife

by Jimmy Henry

'Elsberry' autumn olive, in addition to being a valuable wildlife shrub, is used for landscaping, screens and barriers, ornamental plantings, and field and farmstead windbreaks.

The search for outstanding varieties of woody plants for wildlife food and cover has led to the release of 'Elsberry' autumn olive, *Elaeagnus umbellata*. Elsberry was the result of many years of testing by the Soil Conservation Service plant materials center at Elsberry, Mo.

Autumn olive is not a native plant of the United States. It was introduced into this country about 1830 from China or Japan. The plants which were later released as Elsberry were obtained by SCS for evaluation in 1962 from the Forrest Keeling Nursery in Elsberry. The plant materials center initiated further selection among these plants in search of such characteristics as large, uniform fruits, abundant fruit production, and low branching.

Elsberry autumn olive is an open-growing, much-branching shrub, which reaches an approximate height of 19 feet (about 6 meters) and spread of 22 feet (about 7 meters). It begins to leaf out in early April and its leaves are silvery green. The main trunk and large branches are dark brown; the smaller branches and twigs are yellowish brown and spiney.

The yellow, sweet-scented flowers, appearing in mid-April, provide beautiful scenery to any area. The fruits of Elsberry are red and slightly larger than those of the 'Cardinal' autumn olive. They usually ripen in September and remain on the shrub until late winter. This characteristic makes Elsberry autumn olive a valuable wildlife shrub.

The fleshy, sweet-tasting fruits of Elsberry are favored by songbirds, raccoons, skunks, oppossums, quail, ruffed grouse, mourning doves, pheasants, wild turkeys, and a host of other animals.

This species grows well on deep, sandy, loamy, and moderately fine-textured soils that are moderate to well drained. It does less well on very dry soil and usually fails on shallow, poorly drained, or excessively wet soils. Elsberry appears to thrive equally well on soils ranging from moderately acid to moderately alkaline. Plantings have performed extremely well on acid mine spoils with a pH of 4.0 and above. The plant is tolerant of light shade but has fewer berries when grown in shade. Competition from grass, weeds, or other shrubs slows the young plant, but it overcomes such competition well.

Under favorable conditions, Elsberry autumn olive grows rapidly and produces berries by its third to fifth year. By then the plant is usually 4 to 8 feet (1 to 3 meters) tall.

Many successful field evaluation plantings of Elsberry have been made in plant hardiness zones 5, 6, and 7 to determine its area of adaptation. These zones represent southern Iowa, Illinois, Missouri, Kansas, and central and southeastern Nebraska. In plant hardiness zone 4, the northern part of the above States, Elsberry requires planting on the leeward side of a windbreak to prevent freeze-back injury.

Elsberry has been released as an open-pollinated, seed-propagated cultivar. Propagation by commercial nurseries will be from open-pollinated seed. Elsberry will be commercially available in 3 to 5 years.

Breeder seed is being maintained by the USDA SCS Plant Materials Center, P.O. Box 108, Elsberry, Mo. 63343.

Mr. Henry is manager, Elsberry Plant Materials Center, SCS, Elsberry, Mo.

Contour Orchards Pay

by Frederick E. Bubb

"If it hadn't been for soil and water conservation practices increasing yields, we probably wouldn't make it through the present farm price squeeze," said Rudy Mohr of Mohr Orchards in Lehigh County, Pa. Mohr credits conservation practices with increasing his fruit yields 20 to 30 percent. "That 20 to 30 percent makes the difference between profit and loss for us," he added.

Mohr is not a latecomer to conservation. Actually, he was a conservation pioneer in Lehigh County. He was a member of the first board of directors of the Lehigh Conservation District, a position he held for 8 years. He was also the first orchardist in the county to begin using soil and water conservation practices.

Mohr manages the 1,500-acre apple and peach orchard with his partner, Charles Snelling. When the trees in a valley on Washington silt loam with a silty clay subsoil did not produce the best fruit, Mohr and Snelling began planting on the lighter, shaly soil on upland slopes. The trees needed the well-drained soil to produce quality fruit.

But protecting the soil from erosion and retaining moisture were especially critical on the sloping land. So Mohr and Snelling went to the Soil Conservation Service for help.

SCS Soil Conservation Technician Sam Yohn designed a diversion system for the sloping land. Now, 1,200 acres of the Mohr Orchards are planted on the contour with diversions every 300 to 400 feet down the slope. The diversions control erosion, retain moisture, and protect soil productivity. This is what makes the difference in fruit production.

Mohr said he felt that the water that used to run off his farm in heavy rains could be better used to improve his fruit crop. He pointed with pride to a 25-acre field and said, "Yesterday that field was just a hayfield, but today it is contoured and planted to apple trees. That type of efficient operation requires good, cooperative assistance. Sam Yohn from SCS is here when I need him, and he has the answers to my questions."

Mohr's orchards are planted above a 600-foot elevation to avoid pockets prone to frost damage. The 1,500 acres of orchards stretch for 20 miles across Lehigh County. "By having our operation scattered, a severe hail storm or other isolated natural disaster will not ruin our total fruit crop," said Mohr. "We'll still have some good fruit to sell." Mohr knows what he's talking about when he talks about fruit growing. Fruit from his orchards has won many top awards at the Allentown Fair and at the Pennsylvania Farm Show. Photos of presidents and governors eating Mohr's fruit adorn the walls of his roadside markets.

Because he practices what he believes, Mohr wants to share his knowledge of conservation with others. Occasionally, he asks SCS to present a program to other county fruit growers. After each session, many of the farmers attending also install soil and water

After Harold Schantz saw how terraces and contouring worked on Mohr's orchards, he became convinced that conservation measures would work in his orchards.

conservation practices on their land.

One of these farmers was Harold Schantz, of Schantz' Orchard in Orefield. Schantz is the third generation of his family to be in the orchard business.

"I'm a firm believer in conservation now," said Schantz, "but I was hard to convince in the beginning. SCS, through the conservation district, had helped my dad lay out some contour orchards a while ago, but it was Mohr who really convinced me of the need for both terraces and contouring when I saw them working on his farm."

The Schantz family has 200 acres of their 258-acre farm in orchards. Like the managers of Mohr Orchards, they discovered that trees on a low-lying area of Washington silt loam were not yielding quality fruit. So Schantz also began planting more trees on the well-drained, shaly soil on the uplands. He went to SCS for help in designing diversions to retain soil moisture and control erosion. Almost all the trees planted in the last 15 years in Schantz' orchard have been planted on the contour.

In the late 1960's, the Schantz family built two ponds but neither would hold water. They asked SCS for help. "Sam Yohn showed us how to rebuild the ponds," said Schantz, "and they have both held. We use them for spray irrigation water and for fire protection." When asked about the economic benefits of conservation on the orchard, Schantz replied, "It's hard to say in dollars and cents. But we are saving soil and water. We know we are because we don't have to keep cleaning silt out of the ponds which collect runoff from the farmland." Controlling erosion also prevents soil damage that can reduce yields.

Another view on conservation farming came from Ed Koch, Mohr Orchards' general manager. "We are saving water," he said. "Even in the heavy hurricane rains of the past decade, several of our watersheds did not have any runoff discharge at the outlet end. We were able to hold it all with contouring, terraces, and ponds. Also, with fuel prices going up, farming on the level becomes even more appealing because it saves fuel and energy."

"Because of high fuel costs," said Mohr, "we've had to stop using our big gun irrigation system. This means that getting all the rainfall into the ground is a must." Mohr and Schantz are each using about 30 acres of trickle irrigation, but most of the fruit crop must be supplied with moisture by rainfall.

Both Mohr and Schantz know the interdependence between natural resources and productive fruit trees. The conservation measures on their orchards protect the fertile, moist soil their trees need to produce high quality fruit.

Mr. Bubb is public information officer, SCS, Harrisburg, Pa.

SCS Conservation Technician Sam Yohn helped Rudy Mohr lay out contour lines for planting orchard trees. This field was a hay field in the morning and by nightfall was transformed into an orchard.

New Publications

Environmental Education in Action IV

by the Soil Conservation Service

This publication is a collection of nine articles on environmental education reprinted from *Soil Conservation* magazine. It is the fourth in a series of environmental reprints.

The articles describe conservation education activities for elementary school, junior and senior high school, and college students and for teachers.

The articles discuss nature study areas that were developed by dedicated conservationists to provide outdoor learning experiences for youth; environmental education activities for youth who live in urban areas; a week-long education camp for junior high students; and an unusual learning tool, an 8-foot "earthworm" named Wee Willie Worm who teaches children about the environment.

One article gives results of a study on how many teachers actually go back to their schools and implement an environmental education program after in-service training.

Another article tells about a high school chemistry class and its experiences in monitoring water quality in a Pennsylvania creek. SCS was able to work with the students in using the data they collected in evaluating alternative solutions for flood prevention in the watershed.

Single copies are available from local conservation district offices or from the Information Division, Soil Conservation Service, Room 0054-S, Washington, D.C. 20013.

Reclamation Now: Protecting the Land and the Future

by the Soil Conservation Service

This booklet contains reprints of articles from *Soil Conservation* magazine. It includes a message from former SCS Administrator Mel Davis about the Surface Mining Control and Reclamation Act of 1977 and what it means to SCS, States, mine operators, conservation districts, and landowners.

Remarks by Dave Unger, then USDA deputy assistant secretary for Conservation, Research, and Education, at the "Get Smart on Coal" Symposium are included in the reprint. Mr. Unger discusses USDA activities in research on reclamation and making research results available to those who can use them, technical assistance available especially from SCS under the Rural Abandoned Mine Program (RAMP), and USDA help in setting policies and standards and working with States.

Also in the reprint are articles on: progress made by Wyoming and Montana coal companies in reclamation, Pennsylvania participation in RAMP, a Pennsylvania farmer who farms on reclaimed strip-mined land, and reclamation after sand and gravel mining in New York.

Single copies of the 24-page reprint are available from local conservation district offices or from the Information Division, Soil Conservation Service, Room 0054-S, Washington, D.C. 20013.

Outdoor Opportunities in Forestry, Wildlife Management, and Fisheries Management

by Employment Research Associates

This 52-page booklet examines the many job opportunities in forestry, the forest products industry, wildlife management, and fisheries management. Specific job classifications are listed, along with the qualifications and educational requirements, usual duties, and field prospects associated with the jobs.

The information would be useful to people interested in working for the Soil Conservation Service and related agencies, especially the descriptions of jobs such as forester, range scientist, soil conservation aide or technician, soil conservationist, soil scientist, and wildlife biologist.

The appendix contains lists of courses of study related to the fields addressed in the main section of the booklet with notations as to degrees awarded. Following is a cross list of colleges and universities with locations cited in the preceding course listings.

The appendix also includes employment prospects broken down into government agencies and industrial employers. Sources of career information are given in the section "Books, Pamphlets, and References," as well as under "Professional and Trade Associations."

Copies of the booklet are available for $5.95 plus $1 postage and handling from Employment Research Associates, P.O. Box 1025, Albany, N.Y. 12201.

Conservation Highlights 1979

Summary of Activities of the Soil Conservation Service for Fiscal Year 1979

In fiscal year 1979, employees of the Soil Conservation Service (SCS) of the U. S. Department of Agriculture (USDA) provided technical assistance to individuals, groups, and State and local units of government in applying soil and water conservation practices.

Through ongoing and special programs, SCS employees helped the Nation's landowners and managers make the most of available natural resources while protecting these resources from irreparable damage by erosion and sedimentation.

SCS continued to cooperate with other USDA agencies in meeting the requirements of the Soil and Water Resources Conservation Act of 1977. The act directs the Secretary of Agriculture to conduct a continuing appraisal of the status and condition of the Nation's non-Federal soil, water, and related resources and develop a comprehensive 5-year soil and water conservation program.

Because of a change in the agency's automated progress reporting system, data on individual conservation practices, such as acres of stripcropping or miles of terraces installed, are not reported here.

Conservation Help for Units of Government
SCS employees furnished more than 113,000 services to 29,356 local and State governments during the year. SCS provided basic soil and water data used by local governments in preparing regulations on land use and control of sediment and erosion.

Resource Inventories
In March, SCS released the first of three phases of the comprehensive National Resource Inventories. Phase I included data on sheet and rill and wind erosion, land use, and prime farmlands.

Soil Surveys
In fiscal year 1979, a record 133 soil survey reports were published and an additional 112 survey manuscripts with maps were sent to be printed. More than 67 million acres were mapped during the year.

In September, SCS established an international soils program under which a permanent national staff will provide technical assistance in soil management to tropical and subtropical countries. The program is funded by the Agency for International Development.

Snow Surveys
SCS snow surveyors in the West took an estimated 100,000 measurements of snow and other precipitation, temperature, and soil moisture during the year and issued 3,619 water supply forecasts. More than 200 automated data sites were in operation by the end of the year.

Conservation Tillage
Various forms of conservation tillage, including no-till, were used by U.S. farmers on about 55 million acres of cropland in 1979, compared to about 4 million acres 15 years ago. SCS gives technical assistance to farmers using these modern tillage practices which save fuel and soil.

Plant Materials
SCS plant materials centers released 14 new conservation grasses, legumes, wildflowers, shrubs, and trees to commercial seed growers and nurserymen in fiscal year 1979. The plants will be used to stabilize critical areas, reclaim surface mined lands, control wind erosion, improve range and pasture and wildlife habitat, and prevent nonpoint source water pollution.

Woodlands
SCS assisted landowners in applying woodland improvement practices on 1,159,730 acres of private woodlands. Practices included tree planting, direct seeding, improved harvesting, and site preparation.

Range and Native Pasture
SCS assisted with water developments in much of the range country, especially those areas afflicted by drought. Grazing management systems were the most widely applied practices to improve rangeland. The use of prescribed burning increased as an alternative to the use of herbicides and mechanical treatment for brush management.

During fiscal year 1979, nearly 25 million acres of rangeland and native pasture were adequately protected from erosion.

Recreation
SCS continued to provide technical and financial assistance for establishing or expanding public recreation developments during the year. SCS also assisted private landowners in developing commercial and noncommercial recreation facilities.

Fish and Wildlife
SCS strengthened its policies and procedures to safeguard the quantity and quality of fish and wildlife habitat. As a result, rules and regulations for wetland protection were issued; habitat evaluation procedures were tested; channel modification guidelines were used and evaluated; and mitigation for unavoidable damage was increased.

Soil Moisture Monitoring
SCS began a 5-year monitoring project during the year to obtain information needed to predict soil moisture for large areas in the conterminous 48 States. Data will eventually be collected at 10 locations. The information will be used in making drought and crop yield estimates.

Small Watershed Projects
During fiscal year 1979, 24 small watershed projects were completed, bringing to 498 the number completed since the program began in 1954. These Public Law 566 projects combine conservation measures and structural and nonstructural measures to reduce flood damage and provide agricultural water management, municipal and industrial water, recreation, and wildlife habitat.

Emergency Assistance
Under Section 216 of the Flood Control Act of 1950, SCS obligated an estimated $72 million in watershed emergency assistance to help States repair damage caused by floods and other natural disasters. SCS also published proposed new rules for repairing watersheds damaged by natural disasters.

Flood Plain Management
SCS completed 30 flood plain management studies in 18 States during fiscal year 1979, under Section 6 of Public Law 83-566. These studies include data on natural and beneficial values served by flood plains. Local units of government use this information to develop, amend, adopt, and implement flood plain management programs.

Colorado River Basin Salinity Control Program
Under Public Law 93-320, SCS is cooperating with the Water and Power Resources Service of the U.S. Department of the Interior to reduce salt loadings to the Colorado River, primarily through improved onfarm irrigation water management measures. Under Title I of the act, SCS provides technical and cost-share assistance to irrigators in the Wellton-Mohawk project in Arizona. Structural practices have been installed on 78 farms, involving 11,668 acres, to date.

Under Title II, SCS conducts studies to determine the irrigation improvement measures needed to reduce salt loadings from designated Upper Basin irrigated salt-source areas. USDA cost assistance for the installation of salinity control practices on the first completed Title II study area—in Grand Valley, Colo.—began in fiscal year 1979. SCS provided technical assistance for completing 200 irrigation water management plans and for designing and installing needed practices on 174 farms. The practices include land leveling, water control structures, sprinkler systems, ditch lining, onfarm pipelines, and off-farm lateral lining and pipelines serving two or more farms.

River Basin Studies
SCS has USDA leadership for water and related land resource planning assistance to Federal, State, and local governments. SCS also leads USDA participation in Water Resources Council interagency studies. During the year, river basin planning studies were in progress in more than 40 States and 14 studies were completed.

Environmental Services
In addition to preparing its own environmental impact statements, SCS commented on 495 environmental impact statements prepared by other agencies and cooperated in numerous environmental assessments throughout the Nation. Final rules and regulations for compliance with the National Environmental Policy Act (NEPA) were published in the Federal Register on August 8, 1979. These regulations set SCS policy for integrating environmental values into all planning.

Soil Survey Investigations
SCS began a 4-year study, under an interagency agreement with the U.S. Food and Drug Administration and the U.S. Environmental Protection Agency, to determine background levels of cadmium and lead in 19 food crops and the soils in which they grow. The study is designed to determine maximum allowable limits of these metals in food and crops and in soils that will receive sludge. SCS collected soil and plant samples for analysis at 500 sites in 1979.

Important Farmland Inventory
As authorized by Section 302 of the Rural Development Act of 1972, SCS has the leadership role in USDA for inventorying the Nation's prime agricultural areas. At the end of fiscal year 1979, SCS had completed 262 county maps that delineate prime and unique farmland and farmland of State and local importance and 8 State maps that delineate only prime farmland.

National Agricultural Lands Study
The National Agricultural Lands Study (NALS), to investigate the extent, causes, and impact of agricultural land losses, began in June. The 18-month study is being carried out by an interagency group cochaired by the Secretary of Agriculture and the Chairperson of the President's Council on Environmental Quality. Four SCS staff members have been detailed to work full time on the NALS staff.

Water Quality Management Planning
By the end of fiscal year 1979, most States had submitted water quality plans to the governor for concurrence and to the U.S. Environmental Protection Agency for approval as required by Section 208 of the Clean Water Act. SCS and local conservation districts helped review and develop the areawide water quality plans.

Rural Clean Water Program
SCS and the Environmental Protection Agency, assisted by other USDA agencies, conducted eight workshops and developed a manual for implementing a rural clean water program (RCWP), authorized by Section 35 of the Clean Water Act of 1977. The 1980 Agricultural Appropriation Act included $50 million in USDA's Agricultural Stabilization and Conservation Service budget for an experimental RCWP. The funds are to be used in projects selected primarily from the 64 RCWP applications already submitted by governors in 31 States. SCS is helping develop rules for the 1980 RCWP.

Great Plains Conservation Program
In the 10 Great Plains States, 1,043 farmers and ranchers signed long-term contracts to apply permanent conservation measures on 3.1 million acres. Through the Great Plains Conservation Program, SCS provides technical assistance and cost sharing to landowners to minimize the hazards of recurring drought and wind erosion.

Resources Conservation Act
SCS continued to work toward meeting the mandates of the Soil and Water Resources Conservation Act of 1977 (RCA). In appraising the Nation's soil, water, and related resources, SCS employees on USDA interagency task forces and work groups worked on four RCA draft documents for public review and comment. The documents will be used in developing a national soil and water conservation program.

The first of the four documents, Appraisal 1980, Review Draft, Part I, was published in September. It includes information on the quantity and quality of the Nation's resources and presents a view of current land conditions.

Agricultural Conservation Program
SCS provided technical assistance to farmers and ranchers participating in the Agricultural Conservation Program (ACP) administered by the Agricultural Stabilization and Conservation Service. ACP emphasized the installation of enduring conservation practices and solving environmental problems on privately owned agricultural land.

Rural Abandoned Mine Program
In June, the first contract was awarded under the Rural Abandoned Mine Program (RAMP), established by the Surface Mining Control and Reclamation Act of 1977. During the fiscal year, landowners signed 63 contracts under the program.

Resource Conservation and Development Areas
During fiscal year 1979, work continued in the areas authorized for assistance under the Resource Conservation and Development (RC&D) program and six new areas were authorized for assistance. Objectives of the program, which is under SCS leadership, are to improve the condition and use of the areas' natural resources, the environment, and the economic, cultural, and recreational opportunities for residents.

Summary of Progress Fiscal Year 1979

Reportable progress in soil and water conservation programs assisted by the Soil Conservation Service.

Metric Conversion
To assist readers, information in the tables is given in metric and in units of common measure. A hectare is equal to 2.471 acres.

Progress Item		Fiscal Year 1979	Cumulative to Sept. 30, 1979
Conservation Plans and Related Services			
District cooperators	No.	122,794	2,267,579
	acres	24,982,572	780,079,201
	hectares	10,110,122	315,687,912
Services to land users	No.	2,313,869	—
Individuals and groups assisted	No.	930,446	—
Individuals and groups applying practices	No.	436,951	—
Conservation plans	acres	19,073,872	608,663,699
	hectares	7,718,948	246,318,286
Conservation plans revised	acres	15,202,593	—
	hectares	6,152,291	—
Federal land units in coordinated conservation plans	No.	20	1,357
Federal lands in coordinated conservation plans	acres	219,035	15,429,189
	hectares	89,298	6,243,992
Conservation Help for Units of Government			
Technical services for area planning	No.	113,038	—
Land use and treatment site plan reviews	No.	25,501	—
Agencies assisted	No.	29,356	—
Resource plans	No.	1,004	—
Snow Surveys and Water Supply Forecasting			
Snow survey and water supply forecasts	No.	3,619	—
Resource Studies			
Resource studies	No.	2,992	8,473
Soil Surveys			
Soil surveys	acres	67,118,672	1,481,565,873
	hectares	27,162,054	574,075,167
Great Plains Conservation Program			
Contract applications received	No.	1,471	61,818
	acres	3,082,524	121,337,181
	hectares	1,247,457	49,103,580
Contracts signed	No.	1,043	57,066
	acres	3,090,316	107,757,928
	hectares	1,250,611	43,608,233
Contracts terminated	No.	184	3,701
	acres	338,760	4,558,801
	hectares	137,082	1,844,888
Contracts completed	No.	2,144	41,118
	acres	3,994,388	73,582,264
	hectares	1,616,476	29,777,786
Unserviced applications on hand	No.	4,752	—

Progress Item		Fiscal Year 1979	Cumulative to Sept. 30, 1979
Public Law 566 Watershed Projects			
Applications	No.	13	2,625
Authorized for planning	No.	9	1,783
Approved for construction	No.	25	1,222
Construction starts	No.	8	974
Projects completed	No.	24	498
River Basin Studies			
Initiated	No.	10	136
Completed	No.	14	83
Flood Plain Management Assistance			
Flood plain management studies	No.	30	187
Flood insurance studies	No.	40	275
Colorado River Basin Salinity Control Program			
Planning completed	No. of farms	236	333
Rural Abandoned Mine Program			
Contract applications received	No.	2,533	2,533
Contracts signed	No.	63	63
Unserviced applications on hand	No.	2,400	—
Resource Conservation and Development Areas			
Applications on hand	No.	59	243
	acres	257,235,000	1,035,728,000
	hectares	104,100,000	419,146,000
Areas authorized for assistance	No.	6	184
	acres	22,468,000	778,493,000
	hectares	9,093,000	315,046,000
RC&D area plans accepted	No.	10	172
	acres	41,450,000	721,742,000
	hectares	16,774,000	292,080,000
RC&D measures completed	No.	1,474	15,434

Land Adequately Protected by Conservation Practices		
Cropland	acres	10,655,173
	hectares	4,316,057
Pasture and hayland	acres	5,458,442
	hectares	2,208,961
Range and native pasture	acres	24,638,077
	hectares	9,970,709
Woodland	acres	2,298,638
	hectares	930,229
Wildlife land	acres	2,706,371
	hectares	1,095,233
Recreation land	acres	209,246
	hectares	84,679
Other land	acres	322,511
	hectares	130,516
Total Land Protected	acres	46,288,458
	hectares	18,736,384

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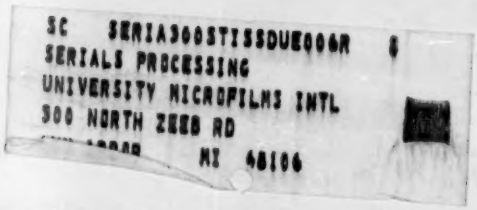

Meetings:

March	
5-8	World Mariculture Society, Catfish Farmers of America, U.S. Trout Farmers Association, and the Fish Culture Section of the American Fisheries Society, New Orleans, La.
9-14	The American Society of Photogrammetry, St. Louis, Mo.
16-18	American Pulpwood Association, New Orleans, La.
21-23	National Wildlife Federation, Miami Beach, Fla.
22-26	North American Wildlife and Natural Resources, Miami Beach, Fla.
April	
2-4	Annual Symposium on Engineering Geology and Soils Engineering, Boise, Idaho
12-17	American Planning Association, San Francisco, Calif.
13-16	Association of American Geographers, Louisville, Ky.
13-17	National Agricultural Plastics Association, Tucson, Ariz.
15-17	International Symposium on Livestock Wastes, Amarillo, Tex.
16-18	Hardwood Plywood Manufacturers Association, Charleston, S.C.
27-29	Chamber of Commerce of the United States, Washington, D.C.
27-30	The Garden Club of America, Norfolk, Va.
May	
3-7	League of Women Voters of the United States, Washington, D.C.
11-14	National Council of State Garden Clubs, Inc., Oklahoma City, Okla.
21-23	Southern Forestry Conference, Biloxi, Miss.
22-27	American Geophysical Union, Toronto, Ontario, Canada
31-June 4	General Federation of Women's Clubs, St. Louis, Mo.